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Mission Creek

Summary of 2015 Surface Water Monitoring Program Results

Washington State Department of Agriculture

Natural Resources Assessment Section

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Introduction

The Washington State Department of Agriculture has monitored pesticide concentrations in surface water throughout the state since 2003. Water samples were collected during the typical pesticide use season (March - September). Fourteen sites were monitored in Washington in 2015, three of which are in the Wenatchee River Watershed. State and federal agencies use this data to evaluate water quality and make exposure assessments for pesticides registered for use in Washington State.

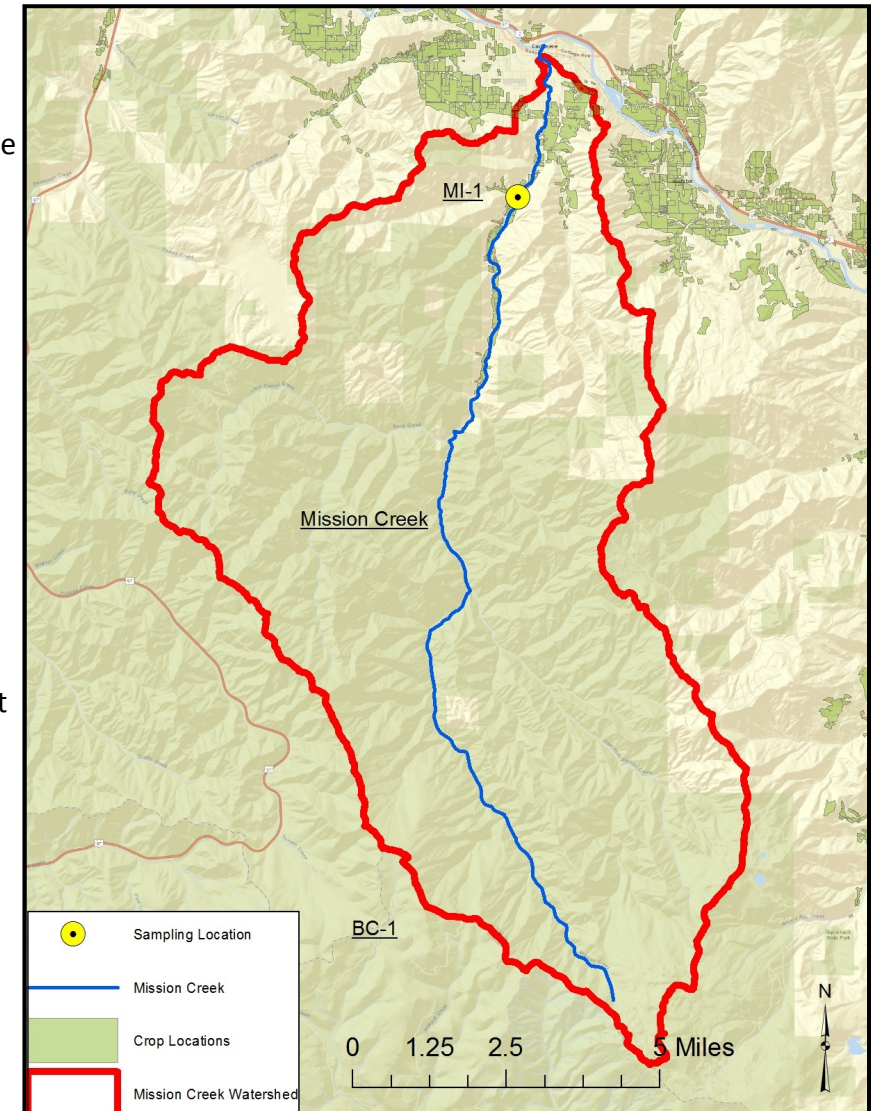
Study Area

Water has been sampled from Mission Creek from 2007 through 2015. The watershed drains about 53,386 total acres with about 1.3% (700 acres) of the watershed being devoted to agriculture. The main crops are pear, fallow, cherry, and apple. Mission Creek has dense riparian vegetation on its banks along most of the reach, which aids in preventing pesticides from contaminating the stream. Mission Creek provides habitat for summer steelhead*.

* Washington State Department of Fish and Wildlife

Sampling Details

- Samples were collected for 25 weeks, from March 10 through August 25.
- Water samples were tested for 206 chemicals: current and legacy insecticides, herbicides, fungicides, rodenticides, wood preservatives, and pesticide degradates.
- Sample analysis for pesticides and total suspended solids was conducted at Manchester Environmental Laboratory in Port Orchard, WA.
- General water quality parameters; dissolved oxygen, conductivity, pH, water temperature, and streamflow were measured at every sampling event.
- Air and water temperature (measured every 30 minutes) was monitored for the entire sampling season.
- For a short period of time, 5 weeks, additional water samples were collected and analyzed for glyphosate and its degradate, AMPA.
- Drought conditions resulted in less than normal streamflow throughout the season.
- Juvenile fish, of an unknown species, were frequently observed at the site during sample collection.



This table shows the pesticides detected, with dates and concentrations. They are color coded to identify which assessment criteria were surpassed. The assessment criteria used here are state and federal water quality criteria, reduced by half for safety. This 0.5 safety factor is used to make sure the criteria protect aquatic life and water quality issues are found early. Watersheds with detections above the criteria are prioritized for more monitoring and educational outreach. See <http://agr.wa.gov/PestFert/natresources/SWM> for more information.

Assessment Criteria																														
May affect fish survival at sensitive life stages																														
Additional level of protection for endangered species		Month and Day		Mar				Apr				May				Jun					Jul				Aug					
		Analyte Name †	Use‡	10	17	25	31	7	14	21	28	5	12	19	27	2	9	16	23	30	7	14	21	28	4	11	18	25		
May affect invertebrate survival		Carbaryl	I-C									0.014																		
		Cycloate	H			0.074																								
Nearing a pesticide state water quality standard		Difenoconazole	F	0.005																										
		Glyphosate	H	--	--	--	--	--					0.069	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
May affect fish growth or reproduction with prolonged exposure		Imazapyr	H	0.011																										
		DEET	IR														0.027													
May affect invertebrate growth or reproduction with prolonged exposure		Piperonyl butoxide	Sy		0.87																									
		Pyraclostrobin	F							0.023																				
May affect aquatic plant growth		Pyridaben	I																		0.19									
		Temperature	N/A	44.90	45.30	46.70	46.90	44.70	47.30	50.80	50.90	52.00	52.30	55.30	57.60	58.10	62.50	60.30	62.00	69.10	69.10	64.80	67.00	64.80	67.00	71.00	66.30	68.70		
May affect aquatic plant growth or reproduction with prolonged exposure		Dissolved oxygen	N/A	12.42	11.88	12.34	11.75	12.45	12.96	12.05	11.95	11.93	10.58	11.3	11.1	10.88	10.53	10.76	10.86	9.93	9.93	9.73	10.07	10.69	9.73	9.91	9.83	10.59		
		Percipitation	N/A	0	0.71	0.21	0	0.16	0.01	0	0	0	0.21	0.7	0.06	0	0	0	0	0.09	0.01	0	0	0	0	0	0	0		
Below all identified criteria		Streamflow	N/A	23.9	57.2	37.4	32.3	24.5	21.3	18.0	15.7	13.2	11.8	21.4	15.0	11.2	9.4	7.6	5.8	4.2	3.4	3.5	1.6	2.1	1.1	0.7	0.7	0.3		
No published criteria available		Total suspended solids	N/A	8	108	17.5	11	8	4	4	3	11	5	28	12	19	12	8	8	10	8	5	2	2	5	2	2	3		
		‡ C: Carbamate,F: Fungicide, H: Herbicide, I: Insecticide, IR: Insect repellent, N/A: Not applicable, Sy: Synergist. †Units are as follows: pesticides, µg/L; temperature, °F; dissolved oxygen mg/L; percipitation, week total inches; streamflow, cfs; and total suspended solids, mg/L. Bold: Indicates a temperature or dissolved oxygen value above state water quality standards.																												
Not detected (below detection limit)																														
No Data		-- --																												

Results Summary

- There were a total of 9 detections, one of which was above an assessment criterion.
- A sample collected in July had a detection of pyridaben, a miticide/insecticide. The concentration was at a level which may affect fish survival at sensitive life stages.
- This is the first time pyridaben has been detected in Mission Creek
- Common trade names for pyridaben are Nexter and Pyramite and labeled for use on pears, apples cherries, apricots and other crops.
- Improvements from 2014 include a reduction in the number of chemical detections above an assessment criterion (3 in 2014), and also no detections of chlorpyrifos in 2015.
- Water temperature was within the healthy range for designated salmonid spawning, rearing, and migration habitat until the end of June through the end of August. 2015 was also an unusually hot and dry year with low stream flows.
- Dissolved oxygen levels remained in the healthy range for salmonid spawning, rearing, and migration habitat for the entire sampling season.

Recommendations

- Read and follow label directions to protect water quality.
- Work to eliminate drift and runoff of pyridaben or other miticides to adjacent surface water.
- Exhibit care especially when applying pesticides (e.g. chlorpyrifos) in spring before vegetation along streams is leafed out.
- Maintain, inspect, and calibrate application equipment
- Manage irrigation to prevent runoff, and check the weather forecast before application to prevent runoff due to rainfall.
- Implement best management practices, including conservation buffers, vegetative filter strips, maintaining groundcover to reduce erosion, sediment basins, and setbacks from water.
- Growers and private landowners should continue to maintain the riparian vegetation along Mission Creek.